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The pathways and performance of undergraduate engineering transfer students

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The **Pathways** and **Performance** of Undergraduate Engineering Transfer Students

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MIDFIELD

Multiple-Institution Database For Investigating Engineering Longitudinal Development

Introduction

Pathways

- Students who attend two or more post-secondary institutions, or transfer students, make up just over one-third of all U.S. students[1].
- Transfer students demonstrate lower retention[2] and graduation rates[3] than "native" students who start and remain at the same institution.
- Transfer students may change to an institution in the same state or transfer to a school in another state.
- Studies focusing on transfer students emphasize the 2-year to 4-year ("**vertical**") transition, while few consider the "**horizontal**" pathway (transfer from a 2-year or 4-year institution to another similar institution).

Performance

- When moving from one institution to another, math and science majors often experience a decrease in GPA (termed "**transfer shock**"[4]), whereas other majors' GPAs stay the same or even increase[5] (known as "**transfer ecstasy**"[6]).
- Understanding differences in pathways and performance is important, because the shrinking pool of U.S. engineering graduates jeopardizes America's position in the global engineering and technology hierarchy[7].

Background to Our Study

- Part of a larger, mixed-methods study involving a longitudinal analysis of the academic pathways of engineering undergraduate transfer students in the Multiple Institution Database for Investigating Engineering Longitudinal Development (MIDFIELD) partnership.
  - Database and partnership among 11 institutions
  - Database includes records from the 1987-88 to the 2009-10 academic school years
  - 1,000,000+ undergraduate student records total
  - These include 200,000+ **engineering** student records
- Quantitative methods: Statistical analyses of student records to model transfer student retention and success
- Qualitative methods: In-depth interviews with ~20 undergraduate engineering transfer students at each of six MIDFIELD institutions

Methods

- Analysis of demographic data of prospective interviewees (n=126) at 4 MIDFIELD schools
- Recruitment strategy: university personnel sent emails to qualifying engineering transfer students asking for their participation in a survey
- Gathered information on prior institutions attended, degrees received, major, and GPA at sending and receiving (MIDFIELD) institutions
- Students' sending institutions were classified as two- or four-year[8] institutions and as in- or out-of-state (compared to MIDFIELD school)

Results

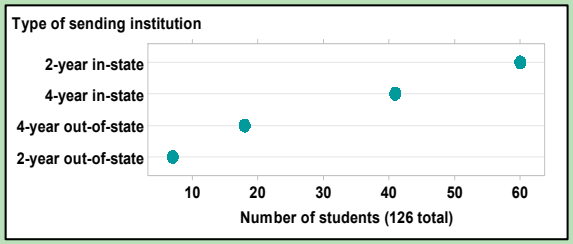

Figure 1. Transfer student pathways

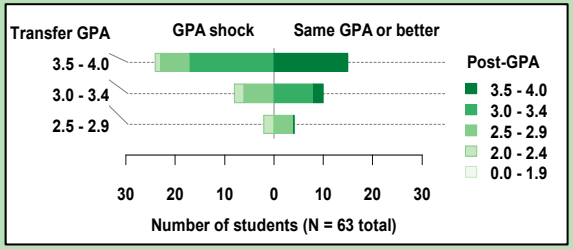

Figure 2. Two-year transfers–GPA outcomes

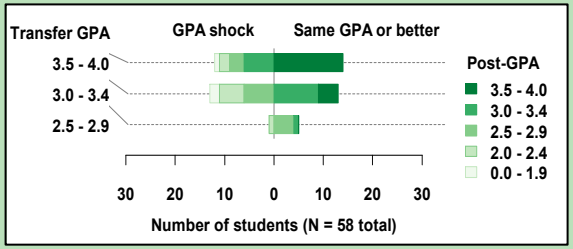

Figure 3. Four-year transfers–GPA outcomes

Discussion

Pathways

- We sought to characterize the transfer patterns (vertical vs. horizontal) in a sample of undergraduate engineering students to determine if the relative dearth of literature on the horizontal pathway compared to the often-studied vertical pathway was warranted.
- Almost half (46%) of the students in our sample transfer laterally from one 4-year institution to another. While horizontal transfer students do not make up a majority of the transfer students in our sample, our results indicate they are still underrepresented in the research on transfer students.
- A majority (80%) of students transferred to a receiving institution in the same state as their sending institution (see Figure 1).

Performance

- A second goal of the study was to investigate the academic outcomes of the sample of students (see Figures 2 and 3).
- Half the total sample experienced a decline in their GPA ("**GPA shock**").
- Students entering the MIDFIELD institution with lower GPAs (2.5-2.9) tended to earn GPAs in the same range or better at their new school. Students entering with a 3.0 to 3.49 were as likely to experience GPA shock as not.
- However, students transferring with high GPAs were more likely to experience GPA shock if they were vertical transfer students (from 2-year institutions).
- More vertical transfer students in our sample reported GPA shock than horizontal transfers, but only by a slight margin.

Implications

- By specifically studying engineering transfers, we hope to increase the shrinking pool of engineering graduates.
- With more attention to, and understanding of, pathway differences, retention and graduation rates among transfer students may improve and time to degree completion rates may decrease.
- More research on horizontal transfers is necessary to help school personnel better prepare transfer students depending on their transfer pathway.
- Based on the findings about GPA shock, results suggest that 4-year institutions may better prepare students for academic transfer than 2-year institutions. Our future research will investigate this further.

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